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III.—*Crania Americana; or, a Comparative View of the Skulls of various Aboriginal Nations of North and South America: to which is prefixed, an Essay on the Varieties of the Human Species.* By SAMUEL GEORGE MORTON, M.D., Professor of Anatomy in Pennsylvania College, &c. Philadelphia. 1839. Folio, pp. 296. With seventy-eight lithographic plates, and a coloured map. Communicated by Dr. PRICHARD, M.D.

THE author, who has spared no expense, and bestowed the most exemplary care in securing the accuracy of his delineations, has exhibited in this valuable work specimens of the skulls of all the aboriginal races in America, many of which have now become extinct. He begins by an ingenious attempt to classify them, as will appear from the following abstract.

The American race, he observes, may be divided into two families:—1. The Toltecan, including all the civilised tribes; 2. The American, embracing all the uncivilised nations of the new world, excepting the Polar tribes, or Mongolian Americans. The American family comprehends several subordinate groups.

1. The Appalachian, including all the nations of North America, excepting the Mexicans, and the tribes north of the Amazons and east of the Andes, of which the physical characters are a round head, large salient and aquiline nose, dark eyes, brown not oblique, large and straight mouth, with teeth nearly vertical, and a triangular face. These tribes are described as warlike, cruel, and unforgiving.

2. The Brazilian branch spreads over great part of South America east of the Andes, between the Amazons and La Plata Rivers. In physical traits they differ little from the Appalachian. Their eyes are small, more or less oblique, and set far apart.

3. The Patagonian branch includes the nations from the south of La Plata to the Straits of Magellan, and the mountain tribes of Chili. They are chiefly distinguished by their tall stature, fine form, and indomitable courage.

4. The Fuegian branch, inhabiting the island of Tierra del Fuego, whose national appellation is Yacannacunnee, are in stature low (five feet four or five inches), have a large head, broad face, small eyes, lank black coarse hair, brown complexion, and in mental character are slow and stupid.

General Observations.—The nations east of the Alleghany mountains, with their cognate tribes, have the head more elongated than the other Americans, in particular the Lenapé, the Iroquois, and the Cherokees. West of the Mississippi the elongated head is again found in the Mandans, Ricaras, Assinaboins, and some other tribes; yet, even in these instances, the characteristic truncation of the occiput is more or less obvious, while many nations east

of the Rocky Mountains have the rounded head, as the Osages, Ottoes, Missouris, Dacatas, &c. The same conformation is common in Florida. The heads of the Charibs are also naturally round, and this character may be traced through the nations east of the Andes, the Patagonians and the tribes of Chili. In these skulls, viewed from behind, the occipital outline is moderately curved outwards, wide at the occipital protuberances, and full from those points to the opening of the ear; from the parietal protuberances there is a slightly curved slope to the vertex, producing a conical or rather a wedge-shaped outline. Although the orbital cavities are large, the eyes are small. The nose constitutes one of the strongest and most uniform features; it is arched without being strictly aquiline; cheek bones large and prominent, inclining rapidly towards the lower jaw, and giving the face an angular conformation; long black lank hair is common to all the American tribes. The beard is generally deficient, and the little that nature gives is soon eradicated. The complexion may be generally described as brown, though there are deviations including all the tints from a decided white to an unequivocally black skin. Intellectually the American is inferior to the Caucasian or the Mongolian family. It is particularly deficient in everything relating to numbers.

The Toltecan family embraces the civilised nations of Mexico, Peru, and Bogota, extending from the Rio Gila, in 33° N., along the western margin of the continent to the frontiers of Chili. In North America the people of this family were spread from ocean to ocean; but in South America they chiefly occupied a narrow slip of land between the Andes and the Pacific ocean, and bounded on the S. by the desert of Atacama. Farther N., in the present republic of New Granada, lived the Bogotese: other uncivilised tribes were everywhere dispersed through the country. It is chiefly in their intellectual faculties that the great difference between the American and the Toltecan families consists. There are evidences of the advanced civilisation of the latter in their roads, aqueducts, fortifications, and other architectural remains.

In the desert of Atacama the Peruvians have for ages buried their dead; the soil, a mixture of sand and salt, and the dryness of the climate preserving them from decay; and the bodies of successive generations of the former inhabitants of Peru may now be examined like those from the Theban catacombs, after the lapse of hundreds, perhaps thousands of years. From the examination of nearly a hundred crania from the desert of Atacama, the great sepulchre of the Peruvians, Dr. Morton conceives that Peru has been successively peopled by two distinct nations, who had differently formed heads, one of which is perhaps extinct.

The oldest, antecedent to the Incas, he terms ancient Peruvians, remains of which have hitherto been found only in Peru. In stature they were not remarkable; and they do not appear to have differed from the cognate nations, except in the formation of the head, which was small, greatly elongated, narrow through the whole length, with a very retreating forehead, and possessing more symmetry than is usual in skulls of the American race. The face projected, the upper jaw was thrust forward, and the teeth were inclined outwards. The orbits of the eyes were large and round, the nasal bones salient, the zygomatic arches expanded, and in their skulls there is a remarkable simplicity in the sutures connecting the bones of the cranium. Dr. Morton considers this as the natural form, though it has in some instances been exaggerated by art. Mr. Pentland, an English traveller, who examined the tombs in the neighbourhood of Titicaca, describes them as in design and execution not unworthy of ancient Greece or Rome. In these tombs, as in those of Egypt, parcels of grain were left beside the dead; and it is a singular circumstance that this corn differs from any now produced in the country. From the measurement of three adult skulls of the ancient Peruvians, the average internal capacity is 73 cubic inches; the capacity of the anterior chamber about one-half that of the posterior; the facial angle 67 degrees. The modern Peruvians, whom Dr. Morton supposes to be identical with the Toltecas, who emigrated from Mexico about A.D. 1050, and appeared in Peru as the Incas during the eleventh century, are described as differing little in person from the Indians around them. The face is round, eyes small, black, and rather distant from each other; nose small, mouth rather large, teeth remarkably fine; complexion dark brown; hair long, black, and rather coarse; skull small, quadrangular in form; occiput greatly compressed, sometimes quite vertical, its sides swelled out; the forehead rather elevated, but retreating. These heads are remarkable for their inequality, which consists chiefly in the greater projection of the occiput on one side than on the other.

In the tombs of the chiefs, were deposited their weapons, utensils, meats and drinks; and a number of women, boys and servants were buried with them, to serve as attendants in the next world. Dr. Morton measured twenty-three adult skulls from the cemetery of Pachacamac, a temple of the sun, near Lima, which was reserved exclusively for the Peruvian nobles. The largest cranium had an internal capacity of 89.5 cubic inches; the smallest 60. The mean of the whole series was 73; the anterior chamber 32; the posterior 42; the coronal region 12; the facial angle 75 degrees.

The Mexicans, who were descended from tribes agreeing in

language and manners, and coming from the N.W., are described by Clavigero as of good stature, and well proportioned, with good complexions, narrow foreheads, black eyes, and thick black glossy hair. The narrow forehead, however, does not belong to the ancient Mexicans, as is proved both by their sculptures and their crania. Dr. Morton obtained eight Mexican skulls older than the European conquest. None of them are altered by art; and they present a striking resemblance, both in size and configuration, to the heads of the ancient Peruvians. The Natchez were probably emigrants from Mexico. Of one of their crania Dr. Morton has given two delineations; one in profile, the other a front view.

The Muskogee, or Creek confederacy, is composed of several nations, or remnants of nations, among whom the most prominent at present are the Seminoles; and the skull of a Seminole warrior is here represented: it presents a lofty but retreating forehead, great width between the parietal bones, and a remarkable altitude of the whole cranium; while the drawing of a Muskogee skull represents a broad but low forehead.

The Algonquin and Lenapé nations (grouped by philologists under the collective name of Algonquin-Lenapés) may be arranged geographically in four groups:—1. the northern, embracing the Knisteneaux, or Crees, and their neighbours as far as the Chippeways and the Algonquins proper; 2. the north-eastern, including the Micmaks, the Etchemins, and Abenakis; 3. the eastern or Atlantic group, embracing the Indians from New England to Virginia and North Carolina; 4. the western group, extending from the Miamis to the Shawnoes. These various tribes occupied a wide tract of country, from the Cumberland river, on the south, to the Great Lakes. They all spoke dialects, though often remote, of a single language. In physical character and social habits they were much like each other.

One drawing of a skull of the Chippeways, belonging to the first group, is given; and the general characters deducible from it are those of the American race, but the frontal region presents an unusual development.

The Menominees, belonging to the fourth group, formerly inhabited the country about Green Bay, in Wisconsin; they are a well-formed people, middle-sized, in complexion fairer than their neighbours; their skulls are rather larger than the average of Indian crania, rather oval-shaped, but marked by a gently-flattened occiput. A drawing is here given from the skull of a young woman of this tribe.

The Miamis and Piankeshaws, two tribes, of the same group, speaking one language, from the territory drained by the Wabash, do not in physical character differ from the other western tribes of the great Algonquin-Lenapé stock. In intellectual powers

they yield to no tribes in the west. Some of the Miami tribes have resisted every attempt at civilisation and conversion, and remain uncompromising pagans to this day. Dr. Morton has one plate of a Miami skull.

Of the Ottigamies and Sanks, of the fourth group, inhabiting the banks of the Mississippi, a large skull is here given; the Potatomies, first group, one skull; the Naumkeags, one of the subordinate tribes of the Lenapé nation in Massachusetts, one skull.

The Delawares (third group), who now occupy the country north of the Kangas, between it and the Missouri river, have skulls more elongated than is usual among the American tribes. Their crania are also narrower, in proportion, in the parietal diameter, and less flattened on the occiput. A drawing of a female skull of the tribe is given.

The Iroquois confederacy consisted originally of five nations—the Mohawks, Oneidas, Onondagas, Cayugas, and Senecas. They called themselves Mengoes, or Mingoes; and constituted the eastern division of this powerful family: while to the west were several other tribes of the same stock—as the Hurons, Erigas, Andastes, &c.; but the latter formed no part of the confederacy.

In 1712, the Tuscaroras, flying from their hunting-grounds in North Carolina, took refuge among the Iroquois, and were admitted as a sixth nation. The language of the Iroquois is energetic and melodious, destitute of labials, but having the guttural aspirate. The remains of this once powerful confederacy are yet scattered through the state of New York, subdued in spirit, and debased by their fondness for intoxicating liquors; they are rapidly diminishing in number, and will soon be known only in history.

Dr. Morton has given the skull of a Cayuga chief, the head of an Oneida warrior, and the head of a Huron chief.

On a comparison of five Iroquois heads, the average internal capacity is 88 cubic inches, which is within two inches of the Caucasian—the average of the anterior chamber, 35·5; that of the posterior, 52·5; of the coronal region, 15.

The Pawnees consist of two nations, the Pawnees Proper and the Ricaras, or Black Pawnees. The former inhabit the country on the river Plata; the latter live below the Mandans, on the Missouri. They do not differ much in physical character from the surrounding nations, but, till lately, offered up human sacrifices—a practice said to be unexampled among the other North American nations. One figure of the skull of a female Pawnee is here given.

The Dacotas, or Sioux, bear an appellation embracing many

tribes of Indians allied to each other by affinity of language and community of customs. They are established on both sides of the Mississippi. A broad face, high cheek-bones, large Roman nose, expanded at the nostrils, wide but low forehead, and flat occiput, with a cinnamon-brown complexion, are their peculiar characteristics. The Dakota language is said to be less sonorous than the Algonquin, which abounds in labials. Many of their religious rites are said to present a striking coincidence with the manners of Asiatic tribes. One skull is here given. The small squared head, the great comparative breadth between the parietal bones, and indifferent frontal development correspond with the features already noticed.

The Osages, now chiefly found in the western part of Arkansas, are yet a powerful tribe. They and their immediate neighbours in the western prairie are much less ferocious than those to the east of the Mississippi. A drawing from the skull of a young warrior is given. Measurements of eleven skulls of Missouri tribes give 77 degrees as a mean of the facial angle; mean internal capacity, 80 cubic inches.

The Blackfoot nation is one of the most powerful in the north-western region; it yet numbers 30,000 souls, and consists of three divisions, of which the Cotomay is the best known; they are fierce, crafty, and courageous. One figure from a Blackfoot skull.

The Flathead tribes of the Columbia River. These tribes are established on both sides of the river, to a distance of many miles from its mouth. They are commonly of diminutive stature, and badly made. The complexion rather lighter than that of the Indians of the Missouri: a wide mouth and lips thick; nose of a moderate size, fleshy, wide at the extremity, with large nostrils, and generally low between the eyes, which are commonly black, are their chief characteristics. The most remarkable feature is the almost universal flattening of the head by various mechanical contrivances. The type of this deformity is the same throughout, consisting in a depression of the forehead and consequent elongation of the whole head, until the top of the cranium becomes, in extreme cases, a nearly horizontal plane. This custom prevails among the Klickatats, Kalaproyahs, and Multuornahs of the Wailamut river, and the Chinouks, Clatsaps, Klastonis, Cowalitsks, Kathlamets, Killemooks, and Chelakis of the Lower Columbia and its vicinity. It is also said that several tribes of the coast, both north and south of the river, follow the same practice; but they are all represented as speaking dialects of the Chinouk language. A constant pressure is applied to the skull of the infant during the first four or eight months. Dr. Morton gives a figure of their cradles, and a minute description of the various contrivances used. Besides the depression of the head, the face is

widened and projected forwards by the process, so as to diminish the facial angle; the breadth between the parietal bones is greatly augmented; and a striking irregularity of the two sides of the cranium almost invariably follows; yet the absolute internal capacity of the skull is not diminished, and, strange as it may seem, the intellectual faculties suffer nothing. The latter fact is proved by the concurrent testimony of all travellers who have visited these tribes. They evince a great deal of cunning and contrivance in bargaining, in which respect they differ from almost all other Indians, who will generally exchange the most valuable article they possess for any bauble which may happen to please their fancy. There are two plates of Chinouk skulls; one (a slave's) of the natural form, the other a chief's, exhibiting the artificial distortion. There are also figures of six other flattened skulls belonging to the various tribes. From eight of those from tribes near the Columbia Dr. Morton gives the following average measurements:—

	Cubic inches.
Internal capacity - - - -	80
Capacity of the anterior chamber -	31·8
Capacity of the posterior chamber -	46·8
Capacity of the coronal region -	11·8
Facial angle, 70 degrees.	

It therefore appears that the operation of flattening and otherwise distorting the head in infancy by artificial contrivances does not diminish the capacity of the cranium, or the whole volume of brain; nor does it materially affect the relative proportions of brain in the two chambers of the cranium, inasmuch as the lateral expansion of the frontal region compensates for the loss of vertical diameter. The coronal region, however, is very much reduced by the process, and the facial angle is diminished at least five degrees.

Skulls from the Tumuli or Mounds.—In North America there are very few mounds east of the Alleghany mountains. Throughout the valley of the Mississippi they are numerous; they are found as far north as the vicinity of Lake Travers, in lat. 46°. They are observed up the Ohio and its tributaries to the base of the Alleghanies, diminish in frequency west of the Mississippi, and are not seen beyond the Rocky Mountains. To the south they are common in Arkansas, and in Mexico very numerous. In Peru and its ancient dependencies they are also in great numbers, and occur even as far south as the country of the Araucos, in Chili. Most of them are merely circular mounds of earth, from 12 to 20 or 30 feet in diameter, and 6 or 8 feet in height; others are of large dimensions and imposing appearance; but the most curious are those constructed in rude resemblances of men and animals, which abound in the Wisconsin territory, and these also

are proved to be sepulchral monuments by the quantity of human remains found in them.

These mounds are variously shaped—circular, elliptical, and pyramidal, while some of them are formed in parapets, like the pyramid of Meidoun, in Egypt. In some of them many skeletons have been found together, regularly disposed. The pyramids at Teotihuacan, north of the city of Mexico, are situate on a plain called Micoatl; *i. e.* “the path of the dead.” In Peru the mounds are called “huacas,” which in the Quichua language signifies “to weep.” Besides human remains, these mounds often contain the bones of bears, otters, beavers and other animals; together with stone hatchets and arrow-heads, vessels of various kinds, fragments of obsidian and mica; and, more rarely, implements of copper and ornaments of ivory. It is also not unusual to find ashes, cinders and burnt bones, resting on a stone platform; showing that the body had been consumed by fire.

Figures are given of three skulls from tumuli from the Ohio, the Upper Mississippi, and the Grave Creek mound in Virginia—one from each. The last, one of the largest and most perfect in North America, is 837 feet in circumference at its base, and 70 feet in height, and is placed on a natural elevation of 80 or 100 feet above the low-water mark of the Ohio. Several skeletons were discovered in it—some in a sitting, others in a standing posture—together with a variety of trinkets and ivory beads, sea shells, and small plates of mica. From the Alabam river, from Tennessee, from Santa, in Peru, one skull from each is here given; and two from the valley of Rimac, in Peru, complete the number mentioned above. All these have the low forehead, high cheek-bones, small facial angle, massive lower jaw, prominent vertex, flat occiput and rounded head of the American race; and the mounds are scattered over those parts of North America which were inhabited by the partially civilised nations included in the Toltecan family. Skeletons in the sitting posture are everywhere characteristic of these tumuli; and so recently as the middle of the last century mounds were constructed as sepulchral monuments in Peru. The mean internal capacity of three heads, which had been distorted by some of the processes already mentioned, is 81 cubic inches: the facial angle does not exceed 75 degrees.

From a review of all the circumstances connected with them, Dr. Morton concludes that these ancient mounds owe their origin to the various branches of the great Toltecan family, which was spread from the confines of Chili to the shores of Lake Superior. That members of it once occupied Florida and the valley of the Mississippi there can be no doubt; but whether before or after their dispersion from Mexico is not yet ascertained. It seems more than probable, however, that the Alligewi, who, according

to Indian tradition, were driven southward by the Iroquois and Lenapé, were Toltec communities, who constructed the mounds for their sepulchres, and erected fortified towns to defend themselves from the barbarous tribes by whom they were surrounded.

Many of the American nations used to deposit their dead in caves; and figures of two skulls from caves—one in the Illinois, one near the Ohio—are among the plates in this work.

The Charibs were at one period a numerous and widely-disseminated people. Their native seats were the northern regions of South America, almost from the river Amazon northward to the sea, including the great valley of the Orinoco, and much of the present territories of Guyana and Venezuela. Thence they extended their migrations to all the Antilles, from Trinidad to Santa Cruz. They are still a numerous people; and are said to differ from the other Indians, by being taller, and having more regular features; noses not so large, and less flattened; cheek-bones not so high; and a character of face with less of the Mongol cast. Their heads are naturally round, as in the other tribes; but many of the Charib nations practised the flattening process. There are here two plates of their skulls; one of a Charib of Venezuela, and one of a Charib of St. Vincent. The Charibs of St. Vincent are described as among the most ferocious and brutal of the American nations. They were cannibals; and having tasted the flesh of all the nations who visited them, are said to have pronounced the French the most delicate, and the Spanish the hardest of digestion.

The Araucanians, the most celebrated and powerful of the Chilian tribes, inhabit the regions between the rivers Bio-bio and Valdivia, and extend from the Andes to the sea. Their name is derived from the province of Arauco. They are robust and muscular, and of a lighter complexion than the surrounding tribes. Endowed with an extraordinary degree of bodily activity, they reach old age with few infirmities, and generally retain their sight, teeth and memory unimpaired. They are brave, discreet and cunning to a proverb; patient in fatigue, enthusiastic in all their enterprises, and fond of war, as the only source of distinction. Three centuries of almost constant warfare have neither subdued nor tamed them; and although occasionally driven to their mountain fastnesses, they have always reappeared as formidable and unconquerable as ever.

They are highly susceptible of mental culture, but despise the restraints of civilization; and those who have been educated in the Spanish colonies have embraced the first opportunity of resuming the haunts and habits of their nation. They possessed some of the useful arts before their intercourse with Europeans.

There are two figures of the skull of an Araucanian chief, named Bashpuni, who was slain in 1835. The head is symme-

trical; the frontal region lofty, but narrow; the posterior cranium full; and the internal capacity not much short of the Caucasian: mean 84·5 cubic inches: the facial angle 76°.

Another and smaller cranium of a chief named Chilicoi, killed in the same battle, is also given. Three Araucanian skulls in Dr. Morton's possession give a mean internal capacity, 79 inches: mean facial angle barely 75°.

All the American tribes, both civilised and uncivilised, bury their dead in a sitting posture. Plate 69, at the end of the volume, shows the attitude of a desiccated body which was brought from New Granada. It is sitting, with its knees drawn up, and its face resting on its hands.

A table of anatomical measurements of the different skulls is added at the end of the volume. They are classed and compared together, from which it appears that the uncivilised nations possess a larger brain by $5\frac{1}{2}$ cubic inches than the Toltecs; while, on the other hand, the Toltecs possess a greater relative capacity of the anterior chamber of the skull. The coronal region, though absolutely greater in the uncivilised, is rather larger in proportion in the civilised tribes; the facial angle is much the same in both, and may be assumed for the whole race at 75 degrees.

From all these facts the author concludes, 1st, that the American race differs essentially from all others, not excepting the Mongolian; nor do the feeble analogies of language, and the more obvious ones in civil and religious institutions and the arts, denote anything beyond casual or colonial communication with the Asiatic nations; and even these analogies may perhaps be accounted for, as Humboldt has suggested, in the mere coincidence arising from similar wants and impulses in nations inhabiting similar climates. 2ndly, that the American nations, excepting the polar tribes, are of one race and one species, but of two great families, which resemble each other in physical, but differ in intellectual character. 3rdly, that the cranial remains discovered in the mounds, from Peru to Wisconsin, belong to the same race, and probably to the Toltec family.

The beauty of its execution would alone render this work deserving of notice; but when the care and accuracy of the observations made by its author, and the learning, ingenuity and skill manifested in his deductions from the data before him, are taken into the account, together with our previous ignorance of the subject of his inquiries, few, if any, of his readers will hesitate in affirming that his book well deserves to be generally known, and to find a place in every library connected with natural science.
